

CLAIMS

What is claimed is:

1. A continuous flow microwave heater for heating fluids, comprising:

-a microwave source,

-an applicator (1) having opposite front walls (8) and side walls (3, 4) with a microwave in-coupling opening (5) connected to said microwave source (11) directly or by way of a hollow conductor,

-a dielectric tube (2) extending through said applicator (1) parallel to the axis of said microwave in-coupling opening (5) in said applicator (1) and normal to two opposite side walls (3, 4) of said applicator (1), of which one includes said in-coupling opening (5),

-a metallic tube stub (6, 7) sealingly connected to each of opposite ends of said dielectric tube (2) outside said applicator (1) for conducting a fluid to be heated through said applicator (1), which fluid forms a load (2), said tube stubs (6, 7) being also joined to said opposite side walls (3, 4) of the applicator (1) in a microwave-tight manner, wherein said applicator (1) has a rectangular shape which is adapted to the wavelength  $\lambda$  of the microwave supplied by the microwave source (11) in such a way that, in the applicator (1), the linearly polarized base mode  $TE_{10}$  of the microwave is excited,

the axis of said dielectric tube (2) extends parallel to the field polarization of the linearly polarized  $TE_{10}$  mode and is disposed at a distance of about  $\lambda/4$  from the respective nearest front wall (8) of said applicator (1), and the axis of

the dielectric tube (2) coincides with the field maximum of the linearly polarized  $TE_{10}$  mode,

-the distance between the center point of the incoupling opening (5) and the axis of the dielectric tube (2) is so selected that field energy coupled into the applicator (1) is completely or nearly completely absorbed in the dielectric tube (2) through which the fluid to be heated is conducted and converted therein to heat, such that no or only negligible reflections occur in the applicator, and

-said tub stubs (6, 7) have an open width adjacent the side walls (3, 4) of the applicator (1), which equals the outer diameter of the dielectric tube (2) over a length of  $\lambda/4$  to  $\lambda/2$ , and their diameter becomes then smaller over a length of  $>\lambda/4$  so as to provide a blocking structure preventing an escape of any microwaves from said applicator (1).

2. A continuous microwave heater according to claim 1, wherein said dielectric tube (2) consists of a material, which is inert with respect to the fluid conducted therethrough.

3. A continuous microwave heater according to claim 1, wherein said front wall (8) of said applicator (1) nearest to said dielectric tube (2) is adjustable along the longitudinal axis of said applicator (1) for generating said base mode  $TE_{10}$ .

4. A continuous microwave heater according to claim 3, wherein, based on the required nominal power output, as said microwave source, one of a magnetron, a klystron and a backward-wave oscillator is selected.